

### Shallow Fracturing Incidents

- 1) A nitrogen frac made its way to surface exiting at a canal about 200 metres (m) away. An unaddressed hole in the production casing at 16 m is likely the main cause of the incident. After fracturing a zone, the cups used to isolate the perforations are released allowing some of the excess pressure to be distributed throughout the wellbore. A hole in the casing that close to surface would be the path of least resistance and is the most likely the location of the nitrogen ( $N_2$ ) escaping to surface.
- 2) A  $CO_2$ /sand frac made its way to a well 16.5 m away and exited through its surface casing vent (SCV). The nearby well's surface casing was set at 62.6 mKB. The original well perforations were at 332 m and both wells had full cement to surface. There are no further indications of problems on either of these wells. There is no indication of a surface casing vent flow (SCVF) or gas migration problem.
- 3) A frac was performed, came to surface through its own surface casing vent, and there is now a SCVF. The company had a cement bond log for this well indicating a cement top at about 300 – 340 m. The well had perforated intervals from 346-234.5 m. These zones were also fraced. Since there was no cement across some of the zones to be fraced, the path of least resistance was up the SCV to surface. This created a conduit through a mud barrier for gas to flow.
- 4) A company performed a series of fracs from 289 – 334 mKB that exited from the SCV of their own well, which was 37 m away. The nearby well is a suspended ellerslie oil well with surface casing set at 289 mKB. The initial flow was fresh water mud mixed with 1-2 percent  $CO_2$ . No residences have been affected. They have been in contact with the nearest resident and no concerns have been expressed.
- 5) A company was performing a series of  $N_2$  fracture treatments when, at the 221 m interval, it was noted an offset well  $N_2$  escaping through the SCV. The cement top on the offset well 122 m (400 feet) away was at 375 m. The flow soon bled off and no further venting was noted after a few days of monitoring.
- 6) A company was performing a series of  $N_2$  fracture treatments at 287-307 m. There was an abandoned and reclaimed well on the same lease 20 m away. After fracturing,  $N_2$  was noted exiting the ground at around the same location as the abandoned well.
- 7) A company was performing a  $N_2$  fracture treatment at the 02 well at a depth of 387.5 mKB. There was a pumping oil well 25 m away belonging to the same company with a cement top at around 955 mKB. The frac made its way to the offsetting oil well, and  $N_2$  and gas are now leaking out of the SCV.
- 8) A company was performing a  $N_2$  fracture on a well at a depth of 382 mKB when frac fluids started blowing out the SCV on the 100 well about 30 m away on Nov 26, 2005. The TOC for the 100 well was about 640 m.
- 9) A company was conducting a  $N_2$  frac at 493 m depth when frac fluids blew out the SCV at the 100 well that was 64 m away. This allowed frac fluids to blowdown and shut in both wells. The TOC for the 100 well is estimated to be at 950 mKB.
- 10) A company was fracturing a new well on the same lease as the 100 well 34 m away. The 02 well was fraced at 248 m and the 100 well began flowing nitrogen out of the SCV. The 100 well has a cement top of 668 mKB, which is 421 m below the fracturing depth. The company applied to produce the vent flow on the 00 well. The request was denied as the EUB does not want to encourage this type of completion method.
- 11) A company was fracturing a new well on the same lease as a sister well 20 m away. On the fracing of the initial deepest intervals of 290.5 – 293.5 and 294.5 – 295.4 mKB, a pop was heard and mist escaped out of the SCV of 02/07-16 well. Fracing operations were ceased. Both wells had cement to surface. There is now a vent flow on the sister well.